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10/711,518	09/23/2004	Ting-Kun Yeh	61994.00017	5517

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EXAMINER	
SAVLA, ARPAN P	

ART UNIT	PAPER NUMBER
2185	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/711,518	YEH, TING-KUN	
	Examiner	Art Unit	
	Arpan P. Savla	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☒ Claim(s) *15-27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 May 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Office action is in response to Applicant's communication filed May 21, 2007 in response to the Office action dated March 22, 2007. Claims 15-27 have been amended. Claims 1-14 have been canceled. Claims 15-27 are pending in this application.

INFORMATION CONCERNING DRAWINGS

Drawings

1. In view of Applicant's amendments, the objection to the drawings has been withdrawn. It should be noted that Applicant's amendments to the drawings are non-compliant under 37 CFR 1.121(d) because the drawings are not properly identified in the top margin as "Replacement Sheet", "New Sheet", or "Annotated Sheet", however in an effort to advance prosecution the Examiner has issued an Office action on the merits instead of a notice of non-compliant amendment. Appropriate correction is required.

Specification

2. In view of Applicant's amendments, the objection to the specification has been withdrawn.

REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections - 35 USC § 112

3. In view of Applicant's amendments, the 112 rejections to **claims 15-27** have been withdrawn.

REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 15-18, 20-25, and 27 are rejected under 35 U.S.C. 103(a) as being obvious over Kurth (U.S. Patent Application Publication 2003/0177296) in view of Watts (U.S. Patent Application Publication 2003/0217224).

6. **As per claim 15**, Kurth discloses an arbitrative apparatus of access request arbitration, comprising:

a plurality of access request selectors, each of the plurality of access request selectors receiving a plurality of access requests (paragraph 0015; paragraph 0018; Fig. 1, elements 103; Fig. 2, element 206); *It should be noted that each "selector" in plurality of agents is analogous to the "access request selectors."*

a specified priority level, wherein the access request selectors each select one of the access requests having the specified priority level (paragraph 0019; paragraph 0021; Fig. 3; Fig. 4, element 400).

Kurth does not expressly disclose an ownership selector, coupled to the plurality of access request selectors, wherein when an access request is being executed, an asking point out signal is sent out to ask for pointing out a position of a next access request;

and wherein said ownership selector receives outputs of the plurality of access request selectors and arranges the outputs into a priority queue;

wherein the ownership selector receives an access request having a priority level lower than the specified priority level, such that the access request having the priority level lower than the specified priority level obtains an access after all the access requests having the specified priority level have been executed at least once.

Watts discloses an ownership selector, coupled to the plurality of access request selectors, wherein when an access request is being executed, an asking point out signal is sent out to ask for pointing out a position of a next access request (paragraphs 0034-0035; Fig. 3, element 304); *It should be noted that the "selector" is analogous to the "ownership selector." It should also be noted that because the buffer is a non-FIFO buffer, it is required some sort of "asking signal" be sent out in order to locate the position of the next request within the buffer.*

and wherein said ownership selector receives outputs of the plurality of access request selectors and arranges the outputs into a priority queue (paragraph 0032;

paragraphs 0054-0055; Fig. 5, elements 502). *It should be noted that the "non-FIFO buffers" are analogous to a "priority queue."*

wherein the ownership selector receives an access request having a priority level lower than the specified priority level, such that the access request having the priority level lower than the specified priority level obtains an access after all the access requests having the specified priority level have been executed at least once (paragraph 0055). *It should be noted that the "higher priority" is analogous to the "specified priority."*

Kurth and Watts are analogous art because they are from the same field of endeavor, that being access request arbitration.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine Watts' request reordering apparatus with Kurth's dynamic request priority arbitration system.

The motivation for doing so would have been to reduce the probability of a bank conflict to roughly 3/16 raised to the nth power, where n is the number of entries in the request buffer from which the next request may be selected by utilizing re-ordering (Watts, paragraph 0061).

Therefore, it would have been obvious to combine Kurth and Watts for the benefit of obtaining the invention as specified in claim 15.

7. **As per claim 16**, the combination of Kurth/Watts discloses a priority setting register coupled to the plurality of access request selectors for setting request numbers of access requests having said specified priority level (Kurth, paragraph 0019; Fig. 3). *It*

should be noted that the "configuration register" is analogous to the "priority setting register."

8. **As per claim 17**, the combination of Kurth/Watts discloses an ownership multiplexer for finding the corresponding request number of the access request from the priority register according to the position in said priority queue (Watts, paragraph 0040; Fig. 3, element 308; Kurth, paragraph 0021). *It should be noted that the "multiplexor" is analogous to the "ownership multiplexer."*

9. **As per claim 18**, the combination of Kurth/Watts discloses said ownership selector further comprises a next ownership selector unit for pointing out the position of the next access request when receiving said asking point out signal (Watts, paragraphs 0034-0035; Fig. 3, element 304). *It should be noted that the "selector" provides the functionality of the "next ownership selector unit."*

10. **As per claim 20**, the combination of Kurth/Watts discloses a 2-input AND gate, in which one input is coupled to said ownership to estimate whether said asking point signal is sent, another input is coupled to receive an estimation signal to estimate whether the next access request is at the last position of the priority queue, and an output is coupled to the ownership selector having the priority level lower than the specified priority level, wherein when both the inputs are true, then the next access request having the priority level lower than the specified priority level is pointed out (Kurth, paragraphs 0032-0035; paragraph 0055). *It should be noted that the "logic" provides the functionality of the "AND gate." Again, it should be noted that because the buffer is a non-FIFO buffer, it is required some sort of "asking signal" be sent out in*

order to locate the position of the next request within the buffer. Also, because of the different priority buffers, requests of a lower priority are always "pointed out" in order to allow higher priority requests to be executed first.

11. **As per claim 21**, the combination of Kurth/Watts discloses wherein at least one said arbitrative apparatus with different priority level can be combined as an arbitrative mechanism wherein said arbitrative mechanism can be an arbiter (Kurth, paragraph 0015, Fig. 1, elements 103). *It should be noted that the "agents" are analogous to "arbiters."*

12. **As per claim 22**, Kurth discloses an arbiter of access request arbitration, comprising:

a plurality of arbitrative apparatus, each one has a different priority level (paragraph 0015; Fig. 1, elements 103); *It should be noted that the "agents" are analogous to "arbitrative apparatuses."*

wherein each one of the arbitrative apparatus with different priority level comprises:

a plurality of access request selectors, each of the plurality of access request selectors receiving a plurality of access request (paragraph 0018; Fig. 2, element 206); *See the citation note for the similar limitation in claim 15 above.*

wherein the access request selectors each select one of the access requests having same priority level (paragraph 0019; paragraph 0021; Fig. 3; Fig. 4, element 400).

Kurth does not expressly disclose an ownership selector, coupled to the plurality of access request selectors, wherein when an access request is being executed, an asking point out signal is sent out to ask for pointing out a position of a next access request;

and wherein said ownership selector receives outputs of the plurality of access requests selectors and arranges the outputs into a priority queue;

wherein the ownership selector receives an access request from the arbitrative apparatus having a lower priority level, such that the access request having the lower priority level obtains an access after all the access requests having a higher priority level have been executed at least once.

Watts discloses an ownership selector, coupled to the plurality of access request selectors, wherein when an access request is being executed, an asking point out signal is sent out to ask for pointing out a position of a next access request (paragraphs 0034-0035; Fig. 3, element 304); *It should be noted that the "selector" is analogous to the "ownership selector." It should also be noted that because the buffer is a non-FIFO buffer, it is required some sort of "asking signal" be sent out in order to locate the position of the next request within the buffer.*

and wherein said ownership selector receives outputs of the plurality of access requests selectors and arranges the outputs into a priority queue paragraph 0032; paragraphs 0054-0055; Fig. 5, elements 502). *See the citation note for the similar limitation in claim 15 above.*

wherein the ownership selector receives an access request from the arbitrative apparatus having a lower priority level, such that the access request having the lower priority level obtains an access after all the access requests having a higher priority level have been executed at least once (paragraph 0055).

Kurth and Watts are analogous art because they are from the same field of endeavor, that being access request arbitration.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine Watts' request reordering apparatus with Kurth's dynamic request priority arbitration system.

The motivation for doing so would have been to reduce the probability of a bank conflict to roughly 3/16 raised to the nth power, where n is the number of entries in the request buffer from which the next request may be selected by utilizing re-ordering (Watts, paragraph 0061).

Therefore, it would have been obvious to combine Kurth and Watts for the benefit of obtaining the invention as specified in claim 22.

13. **As per claim 23**, the combination of Kurth/Watts discloses a priority setting register coupled to the plurality of access request selectors for setting request numbers of access requests having the same priority level (Kurth, paragraph 0019; Fig. 3). *See the citation note for claim 16 above.*

14. **As per claim 24**, the combination of Kurth/Watts discloses an ownership multiplexer for finding the corresponding request number of the access request from the priority setting register according to the position in said priority queue (Watts, paragraph

0040; Fig. 3, element 308; Kurth, paragraph 0021). *See the citation note for claim 17 above.*

15. **As per claim 25**, the combination of Kurth/Watts discloses said ownership selector further comprises a next ownership selector unit for pointing out the position of the next access request when receiving said asking point out signal (Watts, paragraphs 0034-0035; Fig. 3, element 304). *See the citation note for claim 18 above.*

16. **As per claim 27**, the combination of Kurth/Watts discloses a 2-input AND gate, in which one input is coupled to said ownership to estimate whether said asking point signal is sent, another input is coupled to receive an estimation signal to estimate whether the next access request is at the last position of the priority queue, and an output is coupled to the ownership selector having the lower priority level, wherein when both the inputs are true, then the next access request having the lower priority level is pointed out (Kurth, paragraphs 0032-0035; paragraph 0055). *See the citation note for claim 20 above.*

17. Claims 19 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurth in view of Watts as applied to claims 15 and 22 above, and further in view of John L. Hennessy and David A. Patterson, "Computer Organization and Design, The Hardware/Software Interface, Second Edition", (hereinafter "Patterson").

18. **As per claim 19**, the combination of Kurth/Watts discloses logic coupled to receive outputs of the access request selectors having the priority level lower than the specified priority level, an output of the logic being inputted to the last position of the

priority queue of the ownership selector having the specified priority level (Watts, paragraph 0035; paragraph 0055).

The combination of Kurth/Watts does not expressly disclose the logic comprises an OR gate with multi-inputs.

Patterson discloses an OR gate with multi-inputs (pg. B-7, the section entitled "Gates).

The combination of Kurth/Watts and Patterson are analogous art because they are from the same field of endeavor, that being memory systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine Kurth/Watts and Patterson by coupling the outputs of the Kurth/Watts' selectors to inputs of Patterson's OR gate as well as coupling the output of Patterson's OR gate to the input of Kurth/Watts' reordered non-FIFO request buffer because the OR gate yields the predictable result of providing logical disjunction to the arbitration.

Therefore, it would have been obvious to combine Kurth/Watts and Patterson for the benefit of obtaining the invention as specified in claim 19.

19. **As per claim 26**, the combination of Kurth/Watts discloses logic coupled to receive outputs of the access request selectors having the lower priority level, an output of the logic being inputted to the last position of the priority queue of the ownership selector having the higher priority level (Watts, paragraph 0035; paragraph 0055).

The combination of Kurth/Watts does not expressly disclose the logic comprises an OR gate with multi-inputs.

Patterson discloses an OR gate with multi-inputs (pg. B-7, the section entitled "Gates).

Please see the 103 rejection of claim 19 above for the reasons to combine Kurth/Watts and Patterson.

Response to Arguments

20. Applicant's arguments filed May 21, 2007 with respect to **claims 15-27** have been fully considered but they are not persuasive.

21. With respect to Applicant's argument in the last paragraph on page 13 as well as the first paragraph on page 14 of communication filed May 21, 2007, the Examiner respectfully disagrees and directs Applicant's to the rejection of claims 15 and 33 above. As can be seen in Watts, paragraph 0055, an additional criterion of Watts' invention would assign priorities to different buffers such that a next request is selected from a higher priority buffer prior to being selected from a lower priority buffer. Thus, an access request from the lower priority buffer would only obtain access after all the access requests from the higher priority buffer have been executed at least once. Accordingly, Watts clearly discloses how access requests of different priority levels can be arbitrated among (plural) selectors (i.e. buffers) having different priority levels. As for the arrangement using an OR gate, this arrangement is disclosed by the combination of Kurth, Watts, and Patterson in the new 103 rejection above.

22. As for Applicant's argument with respect to independent claim 22, the Examiner respectfully disagrees using the same rationale as discussed above.

23. As for Applicant's arguments with respect to the dependent claims, the arguments rely on the allegation that independent claims 15 and 22 are allowable and therefore for the same reasons the dependent claims are allowable. However, as addressed above, independent claims 15 and 22 are not allowable, thus, Applicant's arguments with respect to the dependent claims are not persuasive.

Conclusion

STATUS OF CLAIMS IN THE APPLICATION

The following is a summary of the treatment and status of all claims in the application as recommended by MPEP 707.70(i):

CLAIMS REJECTED IN THE APPLICATION

Per the instant office action, **claims 15-27** have received a second action on the merits and are subject of a second action final.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arpan P. Savla whose telephone number is (571) 272-1077. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Arpan Savla
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August 15, 2007

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